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Section 1 of 3

THE DUST DEVIL ACADEMY

Air Quality – It's Everybody's Business

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Executive Summary

Maricopa County does not meet the federal health standards for ambient air concentrations of particulate matter, which includes dust or PM-10. Since 1990, when the US Environmental Protection Agency first designated Maricopa County as a Moderate Non-attainment Area for PM-10, the County has repeatedly failed to meet National Ambient Air Quality Standards (NAAQS). Currently, there is a Federal Implementation Plan obligation in place that requires that Best Available Control Measures be implemented no later than June 10, 2000 and that compliance with NAAQS be achieved by December 31, 2001. This obligation resulted from the EPA's partial disapproval of the Arizona 24-hour Standard PM-10 State Implementation Plan (SIP) revision.

Five specific sources have been identified as major contributors to PM-10 non-compliance:

- Unpaved roads
- Unpaved shoulders
- Unpaved parking lots
- Vacant lots
- Agriculture

Modeling done by the Maricopa Association of Governments (MAG) indicated that the area could not attain the standard by December 31, 2001 as required by the Clean Air Act (CAA). An extension has been requested and MAG has developed a Serious Area Plan that includes three areas of effort:

- Improve compliance.
- Establish an education/outreach program.
- Allocate more funding.

These elements need to be in place no later than June 10, 2000 as specified in the CAA. This constitutes a serious requirement since the Phoenix area is currently under a sanction clock. 2 for 1 offset sanctions are effective on March 2, 2000 and will impact regional industries. Highway construction funding sanctions could follow in September.

In response to the requirements, this document is designed to improve compliance with Maricopa County Air Pollution Rules and Regulations, with particular emphasis on Rule 310, which deals with fugitive dust sources. Fugitive dust is a major source of PM-10 in Maricopa County. PM-10 refers to particles of 10 microns or less in size that are suspended in the air. These small particles constitute a threat to public health, because they are small enough to be inhaled into the deepest parts of the lung. Fugitive dust is particulate matter that does not come from a smokestack, tail pipe, or other well-defined opening. Fugitive dust emissions come from activities and conditions such as earthmoving activities that disturb the soil (for example: grading, construction and demolition, trenching and certain agricultural practices) and driving on unpaved areas.

Rule 310 requires any construction project that must obtain an Earthmoving Permit to also submit a Dust Control Plan. A Dust Control Plan involves the implementation of control measures before, during and after conducting any dust generating operation. These controls must be in place on non-work days and after working hours, not just while work is being done on the site. Control measures are techniques, practices or procedures used to prevent or minimize the generation, emission, entrainment and suspension of fugitive dust. To be approved by Maricopa County, the Dust Control Plan must include specific information about the project site, proposed work, and dust control measures to be implemented. The County also requires that a daily log be kept recording all measures taken to comply with Rule 310 and that a copy of the Dust Control Plan be retained on site at all times. There are serious consequences for non-compliance. Any person who violates any Maricopa County air pollution rule or any permit condition (including a Dust Control Plan incorporated into a permit) may be subject to an order of abatement, a civil action for injunctive relief or civil penalties, or may be found guilty of a Class 1 Misdemeanor. Maricopa County Rules consider the property owner, lessee, developer, or general/prime contractor to be the parties responsible for compliance.

This document also describes control measures and work strategies that will assist in ensuring compliance with Rule 310. Advance planning is key to meeting the requirements. Incorporating dust control planning into primary project planning will save time and money over the duration of the project.

Potential sources of fugitive dust include:

- Trackout.
- Bulk material handling and storage.
- Vehicular traffic both on and off the site.
- Storage piles.
- Bare areas on the site.
- Earthmoving activities.

Several simple control measures are easy to implement and, used in combination, they can effectively control dust on the majority of projects. These include:

- Watering – properly timed.
- Chemical stabilization of the soil.
- Use of wind barriers.
- Cleaning of vehicles at site exits.
- Prompt re-vegetation of bare areas.
- Disturbing limited areas at a time.

Also included in this document is a glossary of terms, a brief summary of applicable County air pollution regulations, and detailed information on the requirements for implementation of dust control practices. Since this is a very serious problem for Maricopa County, penalties for non-compliance are also presented in detail.

Background:

Maricopa County does not meet the federal health standards for ambient air concentrations of particulate matter, which includes dust or PM-10. Because of this, the U.S. Environmental Protection Agency (EPA) designated a portion of Maricopa County as a Moderate PM-10 Non-attainment Area under the 1990 Clean Air Act Amendments (CAAA). In 1991 and 1993, plans to ensure PM-10 compliance were submitted. However, since the Maricopa County non-attainment area failed to meet the National Ambient Air Quality Standards (NAAQS) by December 31, 1994, it was re-classified in 1996 as a Serious Area for PM-10. Consequently, a new Serious Area plan for PM-10 was due to EPA by December 10, 1997 and required that Best Available Control Measures (BACM) be implemented no later than June 10, 2000. In addition to the State Implementation Plan (SIP), the EPA also has a Federal Implementation Plan (FIP) obligation currently in place. This obligation resulted from the EPA's partial disapproval of the Arizona 24-hour Standard PM-10 SIP revision. EPA found a deficiency in the basic controls used to reduce emissions from several fugitive dust sources resulting from a failure to implement Reasonably Available Control Measures (RACM). Under a court ordered consent decree, EPA finalized a FIP in July 1998 for the Maricopa County PM-10 non-attainment area to address the following five sources:

- Unpaved roads
- Unpaved shoulders
- Unpaved parking lots
- Vacant lots
- Agriculture

Modeling done by the Maricopa Association of Governments (MAG) indicated that the area could not attain the standard by December 31, 2001 as required by the CAA. However, the CAA allows states to request an extension for up to five years, if it can be demonstrated that the plan includes the most stringent measures included in any state's plan or achieved in practice by any state, which can be feasibly implemented in the area. MAG's consultant has prepared a report analyzing the most stringent measures from around the country and has identified a list of measures feasible for Maricopa County. From this list of measures, the Maricopa County Board of Supervisors has approved three elements, which have been incorporated into the MAG Serious Area Plan. They are considered BACM. The elements are:

- Improve compliance.
- Establish an education/outreach program.
- Allocate more funding.

These elements need to be in place no later than June 10, 2000 as specified in the CAA. This constitutes a serious requirement since the Phoenix area is currently under a sanction clock. 2 for 1 offset sanctions are effective on March 2, 2000 and will impact regional industries. Highway construction funding sanctions could follow in September.

What is PM-10?:

Particulate matter pollution consists of very small liquid and solid particles suspended in the air. Of greatest concern to public health are particles small enough to be inhaled into the deepest parts of the lung. These particles are less than 10 microns in diameter - about one-seventh the thickness of a human hair – and are known as PM-10. Air monitoring data collected in Maricopa County indicates that levels of PM-10 at the edge of a construction site can be as much as three times higher than the allowable standard. Fugitive dust is a major source of PM-10 in Maricopa County. Fugitive dust is particulate matter that does not come from a smokestack, tail pipe, or other well-defined opening. Fugitive dust emissions come from activities and conditions such as earthmoving activities that disturb the soil (for example: grading, construction and demolition, trenching and certain agricultural practices) and driving on unpaved areas.

How Does PM-10 Affect Us?:

When small particles are inhaled, they can penetrate deep into the lungs. Long-term exposure to PM-10 may aggravate chronic respiratory diseases such as asthma, bronchitis

and emphysema. PM-10 particles also affect plants, trees, and crops by coating leaves, thus reducing photosynthesis and growth and making the plant more susceptible to weed and pest infestations. PM-10 is often responsible for part of the haze that we think of as smog. This is a problem not only in our cities, but also in rural areas and pristine areas such as national parks and forests.

What Can I Do To Prevent Fugitive Dust?:

A Dust Control Plan involves the implementation of control measures before, during and after conducting any dust generating operation. These controls must be in place on non-work days and after working hours, not just while work is being done on the site. Control measures are techniques, practices or procedures used to prevent or minimize the generation, emission, entrainment and suspension of fugitive dust. Examples of control measures are:

- Practicing site planning.
- Using wind barriers.
- Watering effectively.
- Utilizing work practices designed to reduce fugitive dust at the source.
- Using trackout controls such as gravel pads, cattle guards, or grizzlies.
- Covering the cargo beds of haul trucks to minimize wind-blown dust emissions and spillage.
- Applying chemical stabilizers.
- Keeping open-bodied haul trucks in good repair, so that spillage may not occur from beds, sidewalls, and tailgates.

What Am I Legally Required To Do?:

The property owner, lessee, developer, or general/prime contractor who engages in earthmoving operations that disturb a total surface area of 0.10 acre (4,356 square feet) is responsible for meeting all of the legal requirements outlined below.

Formulate a Dust Control Plan –

Obtain an Earthmoving Permit and have a Dust Control Plan approved by Maricopa County. Appendix 1 gives instructions for proper completion of permit applications. The Dust Control Plan must ensure compliance with Rule 310, which prohibits visible emissions from exceeding 20% opacity anywhere on site. This Dust Control Plan must contain, at a minimum, all of the following information:

- Name, address, and phone number of the person(s) responsible for the dust generating operation and for the submittal and implementation of the Dust Control Plan.
- A drawing, 8½” x 11” or larger, showing:
    - Site boundaries of the entire project.
    - Acres to be disturbed, including linear dimensions.

    - Locations of the nearest public roads.
    - Planned exit locations onto paved public roadways.
- Control measures to be applied to all actual and potential fugitive dust sources, before, during and after conducting any dust generating operation, including non-work hours and non-work days.
- Dust suppressants to be applied, including the following information:
    - Product specifications, including the Material Safety Data Sheet.
    - Label instructions including recommended method, frequency, and intensity of application.
    - Type, number, and capacity of application equipment.
    - Information on environmental impacts and approvals or certifications related to appropriate and safe use for ground application.
- Specific surface treatment(s) and/or control measures utilized to control material trackout and sedimentation where unpaved and/or access points join paved public roadways.
- A contingency plan consisting of at least one contingency measure for each activity occurring on the site in case the primary control measures prove inadequate.

A copy of the approved Dust Control Plan must be on-site at all times.

Implement the Dust Control Plan –

The control measures in a Dust Control Plan must be implemented during all phases of construction. They are not effective when used after a dust problem arises. If the plan is not implemented consistently, poor working conditions begin to escalate. Equally important is that prevention measures be in place when the site is temporarily inactive. Don't think, "dust is natural, it's so dry here, there's nothing I can do". Not all arid regions have poor air quality from particulate matter. In Maricopa County, excess particulate matter is generated from the disturbance of the desert soil and the lack of stabilization during and after construction. Good dust control measures prevent soil erosion and fugitive dust emissions. Proper planning and use of control measures before, during, and after construction, minimizes fugitive dust emissions and protects public health in the surrounding community. Once the permit is issued, the person responsible for implementing the Dust Control Plan and the person(s) responsible for the dust generating operations on a site must maintain dust control measures at all times. Each job site must have its own permit and plan. Be sure you and your sub-contractors understand all of the responsibilities in the Dust Control Plan. Have the permit and Dust Control Plan available at the job site. If you are a subcontractor, ask for a copy of the Dust Control Plan and Earthmoving Permit before you start work.

Keep a Log –

A daily log must be kept. This log is used to monitor the application, implementation, and effectiveness of control measures. A sample format for this daily log is included in this Manual, see Appendix 2. Keep notes on the effectiveness of dust control strategies used.

Whom Do I Call if I Have Questions?:

Maricopa County has a Dust Control Coordinator who can be reached at (602) 506-6700. The Dust Control Coordinator will review your permit application and help you develop a Dust Control Plan for your site. The County, through the Small Business Environmental Assistance Program, can provide consultation and on-site assistance to help you with compliance and can be reached at (602) 506-6750. The County can also provide you with further information about dust control and the availability of training programs. For more information and to download this document, please visit Maricopa County's Small Business Environmental Assistance Program Internet site at: www.maricopa.gov/sbeap.

Consequences of Non-Compliance:

Any person who violates any Maricopa County air pollution rule or any permit condition (including a Dust Control Plan incorporated into a permit) may be subject to an order of abatement, a civil action for injunctive relief or civil penalties, or may be found guilty of a Class 1 Misdemeanor. Maricopa County Rules consider the property owner, lessee, developer, or general/prime contractor to be the parties responsible for acquiring Earthmoving Permits and Dust Control Plans. Thus, if the general contractor fails to comply, the developer may also be held responsible for the violation.
The County's mission is to protect and improve the quality of life through responsive and effective environmental management. The County will achieve consistent enforcement of air quality laws and regulations by utilizing the following process:

- A Notice of Violation (NOV) will be issued, when the County discovers that a person, business, corporation, or enterprise fails to comply with provisions of Federal, State, or Maricopa County air quality laws and regulations.
- An Order of Abatement will be issued following the issuance of a Notice of Violation when compliance is not attained within a reasonable amount of time.

Additional enforcement action may be initiated when documented evidence reveals that any of the following conditions have occurred:

- The violation results in actual harm or a potential for harm to public health or the environment.
- The violation constitutes a knowing or willful violation of air quality control laws and regulations.
- The violation involves a major deviation from an air quality standard or requirement.
- Repeat violations occur after receiving a Notice of Violation.

The additional enforcement actions that may be taken include:

- Filing a Class I Misdemeanor Criminal Complaint (Citation) pursuant to Arizona Revised Statutes (A.R.S.) 49-502 in Justice Court.
- Filing a Civil Complaint in Superior Court.
- Filing an action for violations, which are classified as a Class I Misdemeanor, Class 2 Felony, Class 5 Felony, or Class 6 Felony.
- Filing an action for Injunctive Relief.

The County will utilize the "Maricopa County Air Pollution Control Penalty Policy" to determine appropriate penalties for resolving both Criminal and Civil Complaints. These penalties range from $2,500 to $10,000 per day per violation, depending on the severity and circumstance of the violation.

Common Violations Found During Inspections:

The following is a list of the most common problems found on work sites. Violations can be avoided by using this as a checklist to assess site compliance.

- Soil surface stabilization not maintained during non-working days and non-working hours.
- Failure to obtain required permits or failure to have permits on site.
- Failure to follow the Dust Control Plan.
- No gravel pad at construction entrances.
- Lack of pre-wetting of work areas and haul routes.
- Insufficient number of water trucks.
- Haul roads and travel ways not stabilized or watered.
- Failure to clean up track-out/deposit on public road.
- No tarps on haul trucks.
- Lack of required record keeping showing implementation of the Dust Control Plan.

GLOSSARY

2 For 1 Offsets Sanction: A compensation for the expansion or construction of a polluting stationary source. Before such expansion/construction begins, an offset permit is required to show that emissions will be reduced at another facility to offset new emissions increases.

Ambient Air – That portion of the atmosphere, external to buildings, to which the general public has access.

ARS – Arizona Revised Statutes.

BACM – Best Available Control Measures.

CAA – Clean Air Act.

CAAA – Clean Air Act Amendments of 1990.

Disturbed Surface Area – A portion of the earth's surface (or material placed thereupon), which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed native condition. This includes graded areas, storage piles, unpaved roads, and unpaved parking lots.

Dust Generating Operation - Any activity capable of generating fugitive dust, including but not limited to, land clearing, earthmoving, weed abatement by discing or blading, excavating, construction, demolition, material handling, storage and/or transporting operations, vehicle use and movement, the operation of any outdoor equipment, or unpaved parking lots. For the purpose of Rule 310, landscape maintenance and/or playing on a ballfield are not considered a dust generating operation. However, landscape maintenance does not include grading, trenching, or any other mechanized surface disturbing activities performed to establish initial landscapes or to redesign existing landscapes.

Earthmoving Operation - The use of any equipment for an activity which may generate fugitive dust, such as, but not limited to, cutting and filling, grading, leveling, excavating, trenching, loading or unloading of bulk materials, demolishing, blasting, drilling, adding to or removing bulk materials from open storage piles, back filling, soil mulching, landfill operations, or weed abatement by discing or blading.

EPA – United States Environmental Protection Agency.

FIP – Federal Implementation Plan. A FIP is a federally implemented plan to achieve attainment of air quality standards, when a State is unable to develop an adequate plan. Also see SIP.

Grizzly – A device (rails, pipes, or grates) used to dislodge mud, dirt, and/or debris from the tires and undercarriage of motor vehicles and haul trucks prior to leaving the work site.

Intermittent Source – A dust generating operation and/or activity lasting for less than 6 consecutive minutes.

MAG - Maricopa Association of Governments.

Millings - The recycled asphalt that is left over after the top layer of a roadway is milled.

NAAQS - National Ambient Air Quality Standards. The Clean Air Act required EPA to identify pollutants of specific importance. Scientific data on the relationships between various concentrations of air pollutants and their adverse effect on humans and the environment were collected. This information was used to develop a list of criteria pollutants and their acceptable ambient levels. These levels are known as the National Ambient Air Quality Standards (NAAQS). Criteria pollutants identified include carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, inhaleable particulate matter (also known as PM-10), and lead. The NAAQS are established to protect public health, property and environment.

Non-attainment Area - An area so designated by the Administrator of EPA, acting under Section 107 of the Clean Air Act, as exceeding national primary or secondary ambient air standards for a particular pollutant or pollutants.

Opacity – A condition of the ambient air, or any part thereof, in which an air contaminant partially or wholly obscures the view of an observer.

Palliative – Also referred to as "surfactant". A substance usually sprayed or spread on the ground surface, that will reduce or moderate the intensity of fugitive dust caused by vehicle travel, earthmoving operations, and construction or wind erosion.

Percent Opacity - The degree to which an effluent plume or any other emission of air contaminants obscures the transmission of light expressed as a percentage.

PM-10 - Also written "PM10 " or "PM_{10}". PM-10 is particulate matter that is ten microns (0.00039 inch) and less in size. PM-10 is much smaller than the diameter of a human hair and can become lodged deep in the lungs. PM-10 includes a portion of wind-blown dust and emission from vehicles, gasoline and diesel equipment, and smoke.

Porosity – "Install wind fences or barriers (<50% porosity)". As used in this statement, <50% porosity means that the fabric or materials of the fence/barrier will be greater than 50% of the entire surface area. The "holes" in the fence/barrier will be less than 50% of the entire surface area.

RACM – Reasonably Available Control Measures. A broadly defined term referring to technological and other measures for pollution control.

Sanction Clock - Under the Clean Air Act automatic sanctions apply to areas that have failed to correct certain deficiencies in their State Implementation Plans. EPA issues findings letters that start "sanction clocks" which give areas a grace period lasting no longer than 18 months to correct the deficiencies, before EPA must apply the first sanction.

SIP – State Implementation Plan. The SIP is the plan adopted by the state of Arizona, which provides for implementation, maintenance, and enforcement of the primary and secondary ambient air quality standards under the Clean Air Act. See also FIP.

Stabilized – A condition where the soil surface is wet, crusted, covered, or otherwise secured, so that dust particles do not become airborne even in high wind.

Unpaved Road – Any road, equipment path, or driveway that is not covered by asphalt, concrete, or other similar material (asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt).

Maricopa County Air Pollution Control Rules and Regulations

Below is a brief description of the County regulations that may apply to your dust generating operation. Before beginning a construction project in Maricopa County, you should be aware of these regulations. Rules 100, 110 and 200 are general sections dealing with definitions, how violations are determined and dealt with, and permit requirements. Rule 310 specifically addresses the regulation of fugitive dust sources.

RULE 100 – General Provisions and Definitions:

The intent of the Maricopa County Air Pollution Control Rules and Regulations are to prevent, reduce, control, correct or remove air pollution within the boundary limits of Maricopa County. Rule 100 sets forth the legal authority for enforcement of the Air Pollution Rules and Regulations and includes over 90 definitions of terms used in all Maricopa County Air Pollution Control Rules and Regulations. Rule 100 also establishes the authority of the Control Officer.

The Control Officer has the right to inspect any premises during reasonable hours and may enter every building, premises, or other place, except the interior of structures used as private residences for the purpose of enforcing and administering these rules and regulations.

In addition, when the Control Officer has reasonable cause to believe that any person has violated or is in violation of the Maricopa County Air Pollution Control Rules and Regulations, the Control Officer may request, in writing, that such person produce all existing books, records, and other documents evidencing tests, inspections, or studies which may reasonably relate to compliance or noncompliance with the rules and regulations.

RULE 110 – Violations:

The purpose of Rule 110 is to specify the classification of violations.

When the Control Officer has reasonable cause to believe that any person has violated any provisions of the Maricopa County Air Pollution Control Rules and Regulations or any requirements of an issued permit, the Control Officer may serve upon such person, by certified mail or in person, an order of abatement or may file a complaint in Superior Court alleging a violation.

The alleged violator is entitled to a hearing if a written request is received within 30 days after issuance of the order. However, in some instances, the order may be conditional and may require a person to refrain from particular acts unless certain conditions are met.

Any person who violates any of these rules or any permit or permit condition issued by the Control Officer may be subject to civil and criminal penalties.

RULE 200 – Permit Requirements:

Rule 200 explains that Maricopa County issues the following types of air pollution control permits (air quality permits):

- Title V Permit
- Non-Title V Permit
- General Permit
- Earthmoving Permit
- Permit To Burn

Rule 200 requires that, before the property owner, lessee, developer, or general/prime contractor begins any earthmoving operation that disturbs a total surface area of 0.10 acre (4,356 square feet) or more, a permit must be obtained from Maricopa County.

RULE 310 – Fugitive Dust Sources:

Rule 310 limits particulate matter (i.e. dust or PM-10) emissions into the ambient air from any property, operation, or activity that may serve as a fugitive dust source. The important aspects of Rule 310 are summarized below:

- Rule 310 requires all earthmoving operations that disturb a total surface area of 0.10 acre or more to obtain an Earthmoving Permit and submit a Dust Control Plan.
- A copy of the Dust Control Plan must remain on the site at all times.
- All control measures must be utilized 24 hours a day, 7 days per week.
- Fugitive dust emissions may not exceed 20% opacity at any time. However, exceeding the opacity standard is permitted if it is a result of one of the following activities:
    - Emergency maintenance of flood control channels and water retention basins. (You must still implement control measures.)
    - Vehicle test and development facilities and operations. (Only if dust is required to test and validate design integrity, product quality, and/or commercial acceptance and if such testing is not feasible within enclosed facilities.)
- Exceeding the 20% opacity standard due to a wind event (i.e., when the 60-minute average wind speed is greater than 25 miles per hour), shall constitute a violation of the opacity standard. However, it shall be an affirmative defense in an enforcement action, if the owner and/or operator can demonstrate all of the following conditions:
    - All control measures required were followed.
    - Better application, implementation, operation, or maintenance of control measures could not have prevented exceeding the 20% opacity standard.
    - The owner and/or operator compiled and retained records.
    - Records document the occurrence of a wind event on the day(s) in question. The occurrence of a wind event must be determined by the nearest Maricopa County Environmental Services Department Air Quality Division monitoring station,

from any other certified meteorological station, or by a wind instrument that is calibrated according to manufacturer's standard and located at the site in question.

- Work sites that are 5 acres or larger must have a project information sign posted at the main entrance and visible to the public. The sign must be a minimum of 4 feet long by 4 feet wide, have a white background, have black block lettering at least 4 inches in height, and must contain the following information, as shown below:
  - Project name.
  - Name and phone number of person(s) responsible for conducting the project.
  - Text stating: "Complaints? Call Maricopa County Environmental Services Department (insert the current/accurate phone number for the complaint phone line)."

- Compliance with approved work practices is required when engaged in any of the following activities:
  - Bulk material hauling off-site onto paved public roadways.
  - Bulk material hauling on-site within the boundaries of the work site.
  - Transporting of materials that could result in spillage, carryout, erosion, and/or trackout.
  - Traversing unpaved hauling and access roads.
  - Earthmoving operations on disturbed surface areas 1 acre or larger.
  - Weed abatement by discing or blading.
  - Stabilization procedures are required for all stationary sources of fugitive dust, including, but not limited to:
    - Unpaved parking lots.
    - Unpaved hauling or access roads.
    - Open areas and vacant lots.
    - Disturbed surface areas.
    - Easements, rights-of-way, and access roads for utilities (electricity, natural gas, oil, water, and gas transmission).
    - Open storage piles.
- A daily log recording all dust control measures used must be kept. The log must be retained for at least 1 year from the date the log was initiated and for at least 6 months after completion of the project.

Compliance Strategies:

This section describes control measures and work strategies that will assist in ensuring compliance with Rule 310.

Site Planning –

Advance planning for dust control should be the first step on any project. A pro-active approach will save the project time and money and should include creation of the Dust Control Plan. Suggestions to consider are:

- Phasing the project such that soil disturbance is minimized.
- Limit the amount of area graded at any one time. The less acreage of disturbed surface area on-site, the less you have to control and the less water or chemical dust suppressant you need.
- Install wind fences or barriers (<50% porosity). Place barriers around storage piles, parking, and equipment staging areas.
- Develop semi-permanent staging areas to cut down on the amount of disturbed area.
- Restrict access on unpaved areas to vehicles and equipment that are necessary that day. Limit unnecessary travel on unpaved surface areas.
- Restabilize disturbed surfaces by paving permanent roads and restoring vegetation as soon as possible.
- Plan sufficient time to allow for pre-wetting of the site prior to initial earthmoving.
- Lastly, make sure everyone working at the job site understands the basic dust control strategies and knows who is responsible for successful dust control.

Trackout –

Trackout, including carryout and spillage, refers to bulk materials that adhere to the exterior surfaces of or are spilled from motor vehicles and/or equipment and subsequently fall onto a paved public roadway. The two pictures below illustrate trackout.

Control of trackout is required for all work sites with a disturbed surface area of five acres or more and from all work sites from which 100 cubic yards of bulk materials are hauled per day. Control of trackout can be accomplished using any of the control devices described and shown below:

- Gravel Pads -A gravel pad is a stabilized construction entrance, designed to remove the mud and dirt from the tires of vehicles leaving a construction site. Use between one and three-inch diameter washed, well-graded gravel or crushed rock. The gravel pad should be at least 30 feet wide by 50 feet long, and a minimum of 6 inches deep. When installing the gravel pad, ensure that it is properly graded.

- Grizzly -A device (rails, pipes, or grates) used to dislodge mud, dirt, and debris from the tires and undercarriage of motor vehicles prior to leaving the work site.

- Paving -The paved surface must extend from the point of intersection with a paved public roadway at least 100 feet back onto the site, with a width of at least 20 feet.

Additionally, clean up of trackout, carryout and spillage is required immediately, if it extends a cumulative distance of 50 feet or more. If the extent is less than 50 feet, clean up at the end of the workday is permissible.

Effective Watering –

Watering is a very effective dust suppressant. When applied regularly, water provides temporary stabilization of disturbed surface areas.
Watering should be sufficient to:

- Make roads and disturbed surfaces appear moist with minimal silt.
- Create a crusted surface on the soil so that it is not easily crumbled between your fingers.
- Provide soil moisture content that is optimal for compaction.
- Prevent visible emissions from exceeding 20% opacity.

<u>Effective watering strategies include:</u>

- Wet the area to depth of cuts or equipment penetration 15 to 30 minutes prior to the start of work.
- Apply water at the end of the day to soak the next day's work area overnight.
- During grading, apply water in sufficient quantity to maintain a moist surface using a water truck.

- During trenching, water using a fine spray or mist.

- During screening, mist material after it drops from the screen.
- After clearing an area, apply water with sufficient frequency to prevent visible emissions (at least every 2 hours). Automatic sprinkler or spray bar systems are optimal in these areas.

<u>For Unpaved Haul Roads / Access Roads / Equipment Paths:</u>

- Apply water in sufficient quantity to maintain a moist surface on unpaved haul roads, access roads and equipment paths.
- Do not apply excessive water since muddy conditions increase track-out.
- If the area is inaccessible to water trucks due to slope conditions or other safety factors, watering should be conducted with hoses or sprinkler systems.
- Surfactants or palliatives added to water increase penetration.

Chemical Stabilizers –

Chemical stabilizers are products that are applied to soil surfaces in order to limit dust generation. An example is shown below.

While there are a variety of products to choose from, finding one that fits your project' s activities can reduce the need for watering, which can result in long term cost savings. Dilution, application rates, and application frequencies vary by product. Typically, chemical stabilizers last between one and twelve months, but vendors should be contacted to obtain information. Some chemical stabilizers are not adequate in areas subject to daily disturbances, high traffic volume, or heavy equipment traffic - check with the product vendor if these conditions occur at your site. Appendix 3 lists some chemical stabilizers and dust palliatives that are undergoing field-testing.
Maricopa County recommends the use of non-toxic, non-corrosive products. All chemical stabilizers used must be in compliance with all applicable environmental laws.

Wind Barriers –

Wind barriers are used to reduce the amount of wind blown dust leaving the site from storage piles of bulk materials. Creating a wind barrier could involve installing wind fences, constructing berms, or parking construction equipment in a position to block the wind. Alone, these barriers are not always adequate for controlling dust. Wind barriers may need to be used in conjunction with watering or chemical stabilizers. Effective wind barriers are three sided structures and made of material with a porosity of 50% or less. The use of wind barriers will reduce the need for watering and use of chemical stabilizers, but not necessarily eliminate this need. Examples of effective wind barriers are shown below.

Bulk Material Handling, Storage and Transporting Operations –

Bulk material handling, storage and/or transporting operations are defined as the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or the moving of bulk materials capable of producing fugitive dust. Advance planning and properly implemented control measures can control fugitive dust. The following practices should be used:

Bulk Material Hauling Off-Site Onto Paved Public Roadways:

- Load all haul trucks such that the freeboard is not less than three inches.
- Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgates.
- Cover all haul trucks with a tarp or other suitable closure.
- Before the empty haul truck leaves the site, either clean the interior of the cargo compartment or cover it.
- Control of trackout is required as stated earlier.

Bulk Material Hauling On-Site Within the Boundaries of the Work Site: When crossing a public roadway, which is open during construction:

- Load all haul trucks such that the freeboard is not less than three inches.
- Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgates.
- Control of trackout is required as stated earlier.

Bulk Material Hauling On-Site, Completely Within Site Boundaries:

- Limit vehicular speeds to 15 mph.
- Apply water to the top of the load to prevent fugitive dust emissions that exceed the 20% opacity limit.

Open Storage Piles:

An open storage pile is any accumulation of bulk material with a 5% or greater silt content that attains a height of three feet at any point and has a total surface area of 150 square feet or more. Appendix 4 gives methods for calculating the surface area of storage piles. The following guidelines apply:

During stacking, loading, and unloading operations, apply water as necessary to control fugitive dust.

When not conducting stacking, loading, and unloading operations, comply with one of the following work practices:

- Cover open storage piles with tarps, plastic, or other material securely enough to prevent wind from removing the coverings.
- Apply water to maintain soil moisture content at a minimum of 12%.
- Apply water to the soil surface until a crust is formed that will prevent wind erosion.

Construct and maintain wind barriers, storage silos, or a three-sided enclosure with walls at a distance from the pile that is no more than twice the height of the pile. The length of the barrier must be no less than the length of the pile and the height must be equal to the

height of the pile, and the barrier must meet the standards outlined earlier for wind barriers.
Note: When using a barrier to control dust, water control must be used also, either to maintain 12% soil moisture or to form a crust on the surface of the material, as explained earlier.

The following pictures illustrate improper bulk material loading, a haul truck improperly loaded above the freeboard, and the proper tarping of loads.

Construction Operations –

To control fugitive dust at construction projects, control measures must be implemented 24 hours a day, 7 days a week.
Below is a list of typical construction activities with suggested control measures and required work practices.

Disturbed Surface Areas - Pre-Activity:

- Use advance planning to minimize the likelihood of generating excessive fugitive dust. When earthmoving activities commence, use the following control measures:
  - Pre-water the work site to the depth of cuts.
  - Proceed in stages to minimize the amount of disturbed surface area present at any given time.

Disturbed Surface Areas - During Construction:
During dust generating operations such as land clearing, earthmoving, weed abatement by discing or blading, excavating, grading, demolition, or other construction activity, these control measures should be observed:

- Apply water or another dust suppressant to the work area.
- Construct fences or 3 - 5 foot high wind barriers adjacent to roadways or urban areas.

Note: The use of fences or wind barriers does not substitute for the use of water or other dust suppressant.
The following picture shows proper dust control practices, effective watering, applied prior to work on a large site.

Earthmoving Operations on Disturbed Surface Areas 1 Acre or Larger:
When the area under construction is 1 acre or larger, water must be applied during earthmoving operations as well as prior to commencement of operations. The following picture illustrates one of the practices which, improperly managed, is a major contributor to fugitive dust emissions.

Unpaved Haul/Access Roads:
On a site, which has unpaved surfaces used for vehicular traffic, vehicle speed must not exceed 15mph and the number of trips using these surfaces must not exceed 20 per day unless one of the following work practices is used:

- Apply water so that the surface is visibly moist.
- Apply and maintain surface gravel.
- Apply and maintain a dust suppressant

Site Maintenance –

Inactive or seldom used portions of the project site must be maintained in such a way that dust entrainment is prevented. Some specific areas requiring attention are presented in this section.

Unpaved Parking Lots:
Unpaved parking lots are defined as any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles. These areas must be maintained using one of the options below:

- Apply and maintain surface gravel.
- Apply and maintain an effective dust suppressant.

Open Areas and Vacant Lots:
To control fugitive dust from open areas and vacant lots on which no activity is occurring, whether or not work is underway at other locations on the site, use one of the following methods:

- Apply water effectively to form a crusted surface.
- Prevent motor vehicle and/or off-road vehicle trespassing, parking, and/or access, by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees, or other effective control measures.
- Uniformly apply and maintain surface gravel or soil stabilizers to all areas that have been disturbed by motor vehicles or off-road vehicles.
- Pave the area.
- Restore the area such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby undisturbed native conditions.

Disturbed Surface Areas - Temporary Stabilization During Non-Work Days and After Work Hours:

- Dust generated from disturbed surface areas on which no activity is occurring, whether at a work site that is under construction or at a work site that is temporarily or permanently inactive, must be controlled by the following methods:
- Apply and maintain a dust suppressant.
- Prevent motor vehicle and/or off-road vehicle trespassing, parking, and/or access.

Disturbed Surface Areas - Permanent Stabilization (Required Within 8 Months after Cessation of Dust Generating Operations):

Disturbed surface areas, on which no activity has occurred for 8 months, must be permanently stabilized, whether or not the entire site is inactive. Employ one of the following control measures:

- Restore area such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby undisturbed native conditions.
- Pave, apply surface gravel, or apply a dust suppressant.
- Establish vegetative ground cover in sufficient quantity.